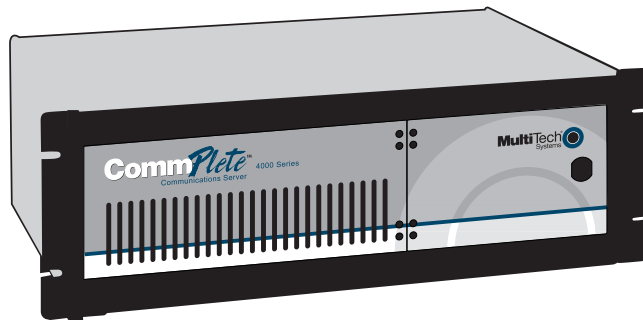

**MultiTech Model IPC-551
Single Board Computer
for CommPlete 4000 Server**



User Guide



COMMPlete 4000 Single Board Computer (IPC-551)

User Guide

82098951 Revision B

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Record of Revisions

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Patents

This product is covered by one or more of the following U.S. Patent Numbers: 5.301.274, 5.309.562, 5.355.365, 5.355.653, 5.452.289, 5.453.986. Other patents Pending.

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Chapter 1

Introduction

This chapter introduces the IPC-551 single-board computer and outlines the system specifications. Sections include:

- About This Manual
- System Specifications
- Safety Precautions

1-1. About This Manual

Thank you for purchasing the IPC-551 embedded CPU card. This single-board computer is PC/AT compatible and produces VGA video. The IPC-551 features CPU speeds as high as 366 MHz, up to 256 MBytes of DRAM working memory, and supports a disk-on-chip memory device (in an SSD flash socket, a “Solid State Disk”). This manual will assist you in installing and setting up the system. The manual contains five chapters and three appendices.

Chapter 1 Introduction

Presents an overview of this manual and presents system specifications and cautionary information to protect both the product and personnel.

Chapter 2 Hardware Configuration

Outlines the components' locations and their functions. Describes how to set jumpers and how to configure this PC card to meet your own needs.

Introduction

Chapter 3 Software Utilities

Describes proper installation of the VGA , Flash BIOS, and the watchdog-timer function.

Chapter 4 Green PC Function

Describes “Green” PC functions, which allow the computer to work at a decreased power level after a period of idleness.

Chapter 5 Award BIOS Setup

Shows how to set up BIOS configurations.

Appendix A Expansion Bus

Describes the expansion bus with slots for PCI and ISA cards and an on-board PC-104 receptacle (an ISA-type connection typically used for testing).

Appendix B Technical Summary

Describes mapping of interrupts, RAM, hard-drive memory and other parameters.

Appendix C Troubleshooting

Outlines error messages and presents solutions for associated problems.

1-2. System Specifications

CPU:

Intel 54C/55C; AMD K5/K6; Cyrix M1/M2.

320/321 pin PGA socket.

75 - 366MHz clock generator.

2.8V - 3.5V voltage regulator.

Memory:

Up to 256MB, EDO/FPM DRAM

Four 72-pin SIMM sockets on board.

Cache:

L1 Cache: (depends on CPU type).

L2 Cache on board: 512K.

Real-Time Clock/Calendar:

CMOS data back up from BIOS setting or BIOS default.

Dallas DS 12887 Real Time Clock.

BIOS:

Award Flash BIOS with plug & play functionality.

Easily updated 128/256KB flash EEPROM.

Supports “Green” power-saving function .

Supports System IO Setup.

Keyboard Connector:

PC/AT type miniature DIN connector.

Supports PC/AT, PS/2 Keyboard or PS/2 Mouse; determined by jumper selection.

Bus Support and Speed:

External ISA bus at 8 MHz.

External PCI bus at 33 MHz.

Internal PCI bus, for VGA & IDE at 33 MHz.

PC-104 bus at 8 MHz.

Display:

Supports SVGA for CRT.

Supports 32-bit PCI Local Bus.

VGA BIOS combines 128/256KB flash ROM with system BIOS.

Supports 15 pin connector 1024 x 768 resolution (256 colors) on SVGA

Introduction

Monitor.

Supports 2 MB video memory.

Watchdog Timer:

The watchdog timer is controlled by software. Once enabled, the system will reboot, unless the timer is re-enabled before the specified timeout duration expires. Timeout durations range from zero to 30 seconds in two-second increments (+/- 25%).

To enable watchdog: use I/O port 0443H

To disable watchdog: use I/O port 0441H

IDE Interface:

Two IDE ports. Supports up to four Enhanced IDE devices.

Floppy Disk Driver Interface:

Supports up to two floppy disk drives: 3.5" and 5.25" (360K / 720K / 1.2M / 1.44M / 2.88M).

Disk-on-Chips Socket:

Supports up to 72MB.

Serial Port:

Two high-speed 16550-compatible UARTs with Send / Receive 16-byte FIFOs.

MIDI Compatible.

Programmable Band Rate Generator.

Parallel Port:

SPP, ECP, EPP Function.

Bi-directional parallel port.

“Green” Power-Saving Function:

Software support determined by BIOS setup.

LED Indicators

System power (at jumper KBL1 on board).

Hard Disk access (at jumper HDL1 on board).

DMA Controller:

82C37 x2

DMA Channels:

7

Interrupt Controllers:

82C59 x2

15 levels

Operating Temperature:

0 to 60°C;

32 to 140°F.

System Power Requirements :

DC Voltage: +5V; minimum +4.75V, maximum 5.25V.

DC Ampere: 15A.

Board Dimensions:

338.5mm x 122mm (13.33in. x 4.80in.)

Board Net Weight:

0.4 Kg.

14.1 oz.

1-3. Safety Precautions

Follow the practices below to prevent electrical damage to personnel and to the computer:

1. Employ standard ESD precautions when working with this product and its components. Static electricity can damage semiconductor devices.
2. Take precautions against electric shock. Do not touch any components of this card when the card is on. Disconnect the power cord when the system is not in use.
3. Disconnect the power cord when you change any hardware devices. For instance, when you connect a jumper or install any cards, a surge of power may damage electronic components that affect the whole system.

Chapter 2

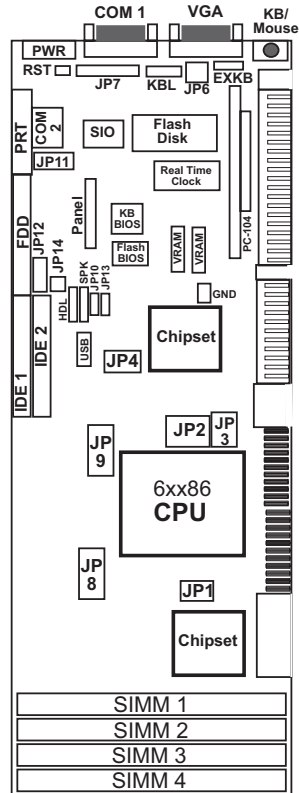
Installation: Hardware Configuration

2-1 List of Jumpers and Connectors

CPU Type & Clock Selection	JP2, JP4
CPU Voltage Selection	JP8, JP9
RS232/422/485 (COM2) Selection	JP7
AT Keyboard / PS/2 Mouse Selection	JP6
SSD Memory Map	JP12
COM1 Connector	COM1
COM2 Connector	COM2
Keyboard ConnectorDIN
External Keyboard ConnectorEXKB
Reset Connector	JP10
Floppy Disk Drive Connector	FDD
Hard Disk Drive Connector	IDE1, IDE2
Hard Disk Drive LED Connector	HDL
Power LED & KeyLock Connector	KBL
LCD Panel Connector	LCD
VGA CRT Connector	VGA
Power Connector	PWR
Printer Connector	PRT
External Speaker Connector	SPK
Memory Installation: SIMM1, SIMM2, SIMM3, SIMM4	
Disk-on-chip Socket	SSD

2-2 Component Locations

Figure 2-1 displays component locations.



*Figure 2-1: Connector, Jumper and Component Locations
on the Single-Board Computer*

2-3 How to Set Jumpers

Jumpers and Caps. Your PC is configured by the positions of jumpers on the circuit board. A jumper consists of two or more metal pins with a plastic base mounted on the card. A small plastic “cap”(with a metal contact inside) is used to connect the pins. For two-pin jumpers, the

active value for user-changeable parameters depends on jumper pins being closed (electrically connected by a cap) or open (not electrically connected). For parameters having more than two values, groups of jumpers (or “jumper blocks”) are used to determine the active value. For example, if a jumper has three pins labeled PIN1, PIN2, and PIN3, you can use a jumper cap to connect PIN1 & PIN2 to activate one value for the parameter. Connecting PIN2 and PIN3 would activate another value.

This manual contains many illustrations of jumper configurations. Jumper caps are depicted as shaded boxes connecting pairs of pins on jumper blocks

Jumper Settings

The IPC-551 comes equipped with one of five CPUs of differing operating speeds: 233 MHz, 266 MHz, 300 MHz, 333 MHz, or 366 MHz.

CPU Type	Core CPU Voltage	CPU Clock	Jumper JP2	Jumper JP4	Jumper JP8 (to set CPU core voltage)	Jumper JP9
AMD K6-2-266 (266 MHz)	2.2V	66 MHz	1-3 4-6	2-4 3-5	3-4	5-6 7-8
AMD K6-2-300 (300 MHz)	2.2V	66 MHz	3-5 4-6	2-4 3-5	3-4	5-6 7-8
AMD K6-2-333 (333 MHz)	2.2V	66 MHz	1-3 2-4	2-4 3-5	3-4	5-6 7-8
AMD K6-2-366 (366 MHz)	2.2V	66 MHz	1-3 2-4	2-4 3-5	3-4	5-6 7-8
Intel Pentium MMX 233 MHz	2.8V	66 MHz	1-3 2-4	2-4 3-5	7-8	5-6 7-8

2-4 CPU TYPE & CLOCK SELECTION

JP2 : Bus Frequency Ratio Selection

JP4 : CPU Clock Selection

JP8, JP9 : CPU Voltage Selection

The jumper settings for each of the five CPU types are shown in a separate figure below :

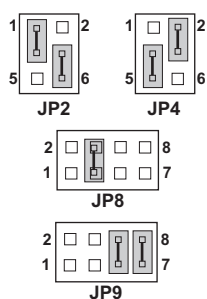


Figure 2-2: CPU & Clock Jumpers for AMD K6-2-266

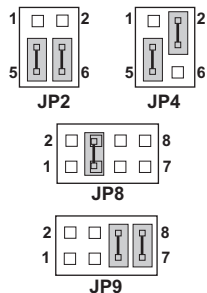


Figure 2-3: CPU & Clock Jumpers for AMD K6-2-300

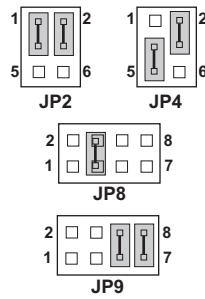


Figure 2-4: CPU & Clock Jumpers for AMD K6-2-333

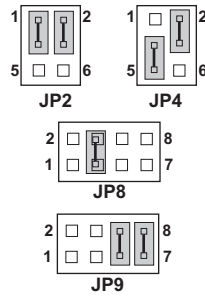


Figure 2-5: CPU & Clock Jumpers for AMD K6-2-366

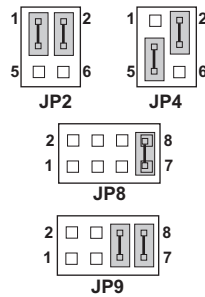


Figure 2-6: CPU & Clock Jumpers for Intel Pentium MMX 233 MHz

2-5 RS232/422/485 (COM2) Selection

JP7 : RS-232/422/485 selection

COM1 supports RS-232 functionality only. (The COM1 port has a receptacle at the edge of the IPC-551 board.)

COM2 is selectable for RS-232, RS-422, or RS-485 functionality. (A COM2 connector is available on the IPC-551 board. To use COM2, you must attach a cable to this connector. This attached cable must terminate to a receptacle that can be mounted on the backplane of the CommPlete 4000 chassis.)

The jumper settings are as follows:

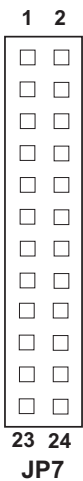


Figure 2-7: RS-232 at COM2

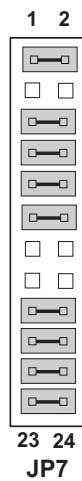


Figure 2-8: RS-422 at COM2



Figure 2-9: RS-485 at COM2

*** Factory default — RS-232.

2-6 AT Keyboard / PS2 Mouse Selection

JP6 : AT keyboard / PS2 mouse selection

The jumper settings are as follows:

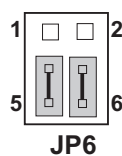


Figure 2-10: AT Keyboard Jumper (Default)

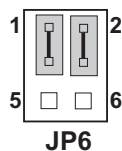


Figure 2-11: PS2 Mouse Jumper

2-7 Memory Map for SSD (Solid State Disk)

JP12, JP14 : SSD Memory Mapping Selection.

This 32-pin disk-on-chip socket supports an SSD up to 72MB. This plug-and-play flash ROM SSD can be installed as though it were a hard disk. If mapped as Drive C, it can be used to boot up the computer with MS-DOS installed.

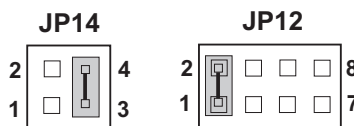


Figure 2-12: SSD Memory Map -- CC000h-CDFFFh

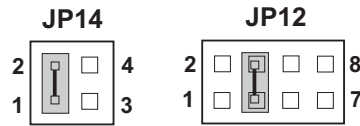


Figure 2-13: SSD Memory Map -- D0000h-D1FFFh

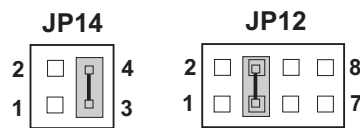


Figure 2-14: SSD Memory Map -- D4000h-D5FFFh

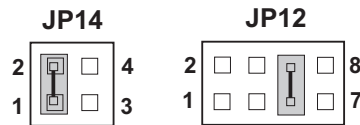


Figure 2-15: SSD Memory Map -- D8000h-D9FFFh

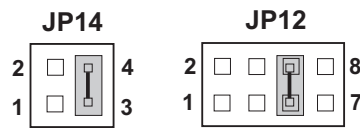


Figure 2-16: SSD Memory Map -- DC000h-DDFFFh

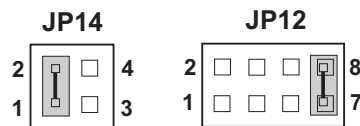
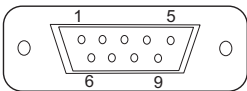


Figure 2-17: SSD Memory Map -- E0000h-E1FFFh

***Factory default—CC000h-CDFFFh

2-8 COM1 Connector

COM1 : connector type is DB9 male and has pinout as follows:



COM1

Figure 2-18: COM1 Connector

PIN	SIGNAL FUNCTION
1	DCD
2	RX
3	TX
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

2-9 COM2 Connector

COM2 : COM2 Connector

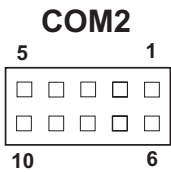


Figure 2-19: COM2 Connector

The COM2 Connector assignments are as follows:

PIN	SIGNAL FUNCTION		
	RS-232	RS-422	RS-485
1	DCD	TX-	DATA-
2	RX	TX+	DATA+
3	TX	RX+	NC
4	DTR	RX-	NC
5	GND	GND	GND
6	DSR	RTS-	NC
7	RTS	RTS+	NC
8	CTS	CTS+	NC
9	RI	CTS-	NC
10	NC	NC	NC

2-10 Keyboard Connector

Connector Type: **DIN**

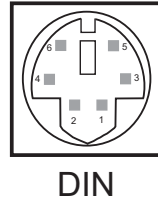


Figure 2-20: Keyboard DIN Connector

Supports PC/AT keyboard. Pin assignments are as follows:

PIN	SIGNAL FUNCTION
1	KBDATA
2	NC
3	GND
4	Vcc
5	KBCLK
6	NC

2-11 External Keyboard Connector

EXKB: external keyboard connector

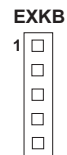


Figure 2-21: External Keyboard Connector

The pin assignments are as follows:

PIN	SIGNAL FUNCTION
1	KBCLK
2	KBDATA
3	NC
4	GND
5	Vcc

2-12 Reset Connector



Figure 2-22: Reset Connector

JP10 : Reset Connector.

The pin assignments are as follows:

PIN	SIGNAL FUNCTION
1	Reset
2	Ground

2-13 Floppy Disk Drive Connector

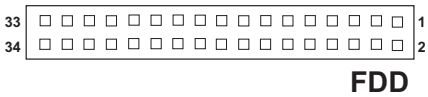


Figure 2-23: Floppy Disk Drive Connector

FDD : Floppy Disk Drive Connector

The pin assignments are as follows:

PIN	SIGNAL F'N	PIN	SIGNAL FUNCTION
1	GND	2	RPM
3	GND	4	NC
5	GND	6	RATE0
7	GND	8	INDEX
9	GND	10	MTR0
11	GND	12	DRV1
13	GND	14	DRV0
15	GND	16	MTR1
17	GND	18	DIR
19	GND	20	STEP
21	GND	22	WDATA
23	GND	24	WGATE
25	GND	26	TRK0
27	GND	28	WRPRT
29	GND	30	RDATA
31	GND	32	SEL
33	GND	34	DSKCHG

2-14 Hard Disk Drive Connector

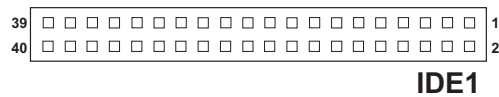


Figure 2-24: Hard Disk Drive Connector for IDE1

IDE1: Hard Disk Drive Connector

The CommPlete 4000 has two HDD connectors, IDE1 and IDE2. The pin assignments are as follows:

PIN	SIGNAL FUNCTION	PIN	SIGNAL FUNCTION
1	IDERST	21	IDEREQ0
2	GND	22	GND
3	IDED7	23	IDEIOW
4	IDED8	24	GND
5	IDED6	25	IDEIOR
6	IDED9	26	GND
7	IDED5	27	IDERDY
8	IDED10	28	PULL HI
9	IDED4	29	IDEACK0
10	IDED11	30	GND
11	IDED3	31	IRQ14
12	IDED12	32	IOCS16
13	IDED2	33	IDEA1
14	IDED13	34	GND
15	IDED1	35	IDEA0
16	IDED14	36	IDEA2
17	IDED0	37	IDECS1P
18	IDED15	38	IDECS3P
19	GND	39	IDELEDP
20	N.C.	40	GND

IDE2

Figure 2-25: Hard Disk Drive Connector for IDE2

Hardware Configuration

IDE2: Hard Disk Drive Connector

The pin assignments are as follows:

PIN	SIGNAL F'N	PIN	SIGNAL FUNCTION
1	IDERST	21	IDEREQ1
2	GND	22	GND
3	IDED7	23	IDEIOW
4	IDED8	24	GND
5	IDED6	25	IDEIOR
6	IDED9	26	GND
7	IDED5	27	IDERDY
8	IDED10	28	PULL HI
9	IDED4	29	IDEACK1
10	IDED11	30	GND
11	IDED3	31	IDESIRQ
12	IDED12	32	IOCS16
13	IDED2	33	IDEA1
14	IDED13	34	GND
15	IDED1	35	IDEA0
16	IDED14	36	IDEA2
17	IDED0	37	IDECS1S
18	IDED15	38	IDECS3S
19	GND	39	IDELEDS
20	N.C.	40	GND

2-15 Hard Disk Drive LED Connector



Figure 2-26: Hard Drive LED Connector

HDL : Hard Disk Driver LED Connector

The pin assignments are as follows:

PIN	SIGNAL FUNCTION
1	Vcc
2	HDD Active Signal
3	HDD Active Signal
4	Vcc

2-16 Power LED & Keylock Connector

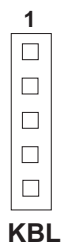


Figure 2-27: Power LED and Keylock Connector

KBL : Power LED & keylock Connector

The pin assignments are as follows:

PIN	SIGNAL FUNCTION
1	Power LED
2	NC
3	Ground
4	Keyboard INT
5	Ground

2-17 VGA CRT Connector

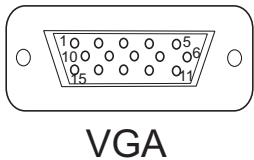


Figure 2-29: VGA Connector for CRT

VGA : VGACRT Connector

The pin assignments are as follows:

PIN	SIGNAL F'N	PIN	SIGNAL FUNCTION
1	RED	9	NC
2	GREEN	10	GND
3	BLUE	11	NC
4	NC	12	NC
5	GND	13	HSYNC
6	GND	14	VSYNC
7	GND	15	NC

8 GND

2-18 Power Connector

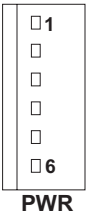


Figure 2-30: Power Connector

PWR : Power Connector

The pin assignments are as follow :

PIN	SIGNAL FUNCTION
1	NC
2	+5V
3	+12V
4	-12V
5	GND
6	GND

2-19 Printer Connector

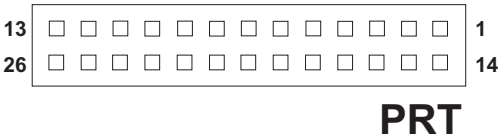


Figure 2-31: Printer Connector

PRT : Printer Connector

As to link the Printer to the card, you need a cable to connect both DB25 connector and parallel port. The pin assignments are as follows:

PIN	SIGNAL F'N	PIN	SIGNAL FUNCTION
1	STB	14	AUTFE
2	P0	15	ERROR
3	P1	16	INIT
4	P2	17	SLCTIN
5	P3	18	GND
6	P4	19	GND

Hardware Configuration

7	P5	20	GND
8	P6	21	GND
9	P7	22	GND
10	ACK	23	GND
11	BUSY	24	GND
12	PE	25	GND
13	SLCT	26	NC

2-20 External Speaker Connector

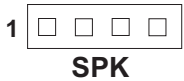


Figure 2-32: External Speaker Connector

SPK: External Speaker Connector

The pin assignments are as follows:

PIN	SIGNAL FUNCTION
1	Vcc
2	Ground
3	NC
4	Speaker Signal

2-21. Solid-State Disk Socket



Figure 2-36: Solid-State Disk Socket
SSD: The 32pin Disk-on-Chip Socket has pin assignments as follows:

PIN	FUNCTION	PIN	FUNCTION
1	NC	17	SD3
2	NC	18	SD4
3	NC	19	SD5
4	SA12	20	SD6
5	SA7	21	SD7
6	SA6	22	CE
7	SA5	23	SA10
8	SA4	24	OE
9	SA3	25	SA11
10	SA2	26	SA9
11	SA1	27	SA8
12	SA0	28	NC
13	SD0	29	NC
14	SD1	30	VCC
15	SD2	31	WR
16	GND	32	VCC

2-22. Memory Installation

The IPC-551 Pentium Embedded Computer will support two double DRAM banks , bank 0 and bank 1, each consisting of two 72-pin SIMM sockets.

Hardware Configuration

Note: SIMM 1,2,3,4 for double-bank DRAM module (72pin x 32bit x 4).

DRAMBANK CONFIGURATION

SIMM 1 BANK 0	SIMM 2	SIMM 3 BANK 1	SIMM 4	TOTAL MEMORY
4M	4M			8M
4M	4M	4M	4M	16M
8M	8M			16M
8M	8M	4M	4M	24M
8M	8M	8M	8M	32M
16M	16M			32M
16M	16M	4M	4M	40M
16M	16M	8M	8M	48M
16M	16M	16M	16M	64M
32M	32M			64M
32M	32M	4M	4M	72M
32M	32M	8M	8M	80M
32M	32M	16M	16M	96M
32M	32M	32M	32M	128M
64M	64M			128M
64M	64M	4M	4M	136M
64M	64M	8M	8M	144M
64M	64M	16M	16M	160M
64M	64M	32M	32M	192M
64M	64M	64M	64M	256M
128M	128M			256M

Hardware Configuration

Chapter 3

Software Configuration

This chapter presents detailed information on VGA video mode and on the “ Watchdog” function. It also describes how to install configurations.

Sections include:

VGA Drivers Utilities

Flash BIOS Update

Watchdog Timer Configuration

3-1. VGA Driver Utilities

3.1.1. VGA Drivers

The VGA interface for IPC-551 supports a great range of display modes, such as SVGA, STN, TFT, EL, etc.

This single-board computer is shipped with two utility diskettes containing two files, VGA.EXE and AWDFLASH.EXE, for VGA driver setup and Flash BIOS update.



Utility Disk#1

- 1. Awdflash 5.35A program update for Awardflash BIOS
- 2. Win3.1 program for Win3.1 system
- 3. Win95 program for Win95 system
- 4. WinNT 3.5x program for WinNT3.5x

Software Configuration

..... 5. WinNT 4.0 program for WinNT4.0



UtilityDisk#2

..... OS/2 Video Device Driver for OS/2 3.0 system

Before you change any setup for VGA or system BIOS, you must first install your utility diskette. Then the file will automatically be decompressed ('unzipped') and a sub-directory will be created on your hard drive.

3-1-2. Installing the VGA Driver for PCI

Each procedure below explains how to install the VGA driver into a particular operating system (Windows 3.1, Windows 95, Windows NT, or OS/2 Warp).

1. Installing the VGA driver into Windows 3.1

- (A) To install the VGA driver into Windows 3.1, insert Utility Disk#1 into the floppy disk drive (drive A or B). Using File Manager, go to the “win31” directory where the VGA driver files are located.
- (B) Click on the “Setup.exe” file to launch installation of the VGA driver.
- (C) Follow the instructions presented on the screen and complete the installation.
- (D) After the installation is complete, you must shut down and restart the system in order for the changes to take effect.

2. Installing the VGA driver into Windows 95

- (A) Click on **Start | Settings | Control Panel**.
- (B) On the Control Panel, click the **Display** icon and enter the **Settings** tab of the **Display Properties** window.
- (C) Click on **Change Display Type**.
- (D) In the **Change Display Type** dialog box, select **Adapter Type**, and click on **Change**. The PC will compile a list of devices that it supports.
- (E) When the Select Device dialog box appears, click on **Have Disk**.
- (F) Click on **Browse** and select the Win95 file on the diskette.
- (G) Select **Chips & Tech 65550 PCI Video Driver**.
- (G) Follow screen instructions to completion.

3. Installing the VGA driver into Windows NT 3.5

- (A) From the Main group, select Control Panel and click on the Display icon.

Software Configuration

- (B) Select **Change Display Type...**(Alt-C)
- (C) From the **Adapter Type** window, select **Change...**
- (D) From the **Select Device** window, choose **Other**.
- (E) Insert the CHIPS WinNT driver disk into the appropriate floppy drive and click **OK**.
- (F) Click on **Install**. Then, follow the prompts on the screen.

4. Installing the VGA driver into Windows NT 4.0

- (A) Click on **Start | Settings | Control Panel**.
- (B) On the Control Panel, click on **Display | Settings | Display Type**.
- (C) Click on **Change** and enter the **Change Display** area tab of the **Display Properties** window.
- (D) In the **Change Display Type** window, click on the **Have Disk** button under **Display Type**. This will bring up the **Install from Disk** window.
- (E) Place the diskette containing the video driver into floppy drive A.
- (F) In the **Select Device** window, click on the **Other** button. Enter the source directory where the Windows NT driver files are located (usually **a:\winnt40**). Press **<ENTER>**.
- (G) The name of the Chips and Technologies Video Accelerator driver will appear in the **Display** list box. Double-click on the driver. Once the installation is complete, the system must be shut down and restarted.
- (H) Upon restart, select the desired display settings from the **Display Properties** dialog box. Click on **Test** to test the newly selected graphics mode.
- (I) A color test screen should appear, followed by the **Testing Mode** window. Click **Yes** to continue.
- (J) The **Display Properties** window will appear. Click on **OK** for the new settings to take effect.

5. Installing the VGA driver into OS/2 Warp Operating System

(A) Preliminary Steps:

- OS/2 DOS Support must be installed.
- If you previously installed SVGA support, you must reset the system to VGA mode. VGA is the default video mode. Enable VGA when OS/2 is to be installed.
- To restore VGA mode, use SELECTIVE INSTALL. Specify VGA as the PRIMARY DISPLAY. For more information on this procedure, see the section on Changing Display Adapter Support in the OS/2 Users Guide.

(B) Start Driver installation from Utility Disk#2

- (B1) Open an OS/2 full screen or windowed session.
- (B2) Insert Utility Disk#2 into the floppy disk drive. Utility Disk#2 contains the 65550 Display Driver.
- (B3) At the OS/2 command prompt, type the following commands to copy the files to the OS/2 drive:

Type **A:** and press **ENTER** to make this the default drive.
Type **Setup A: C:** and press **ENTER**.

When the setup program has finished running, you must shut down and then restart the computer in order for the change to take effect.
- (B4) After restarting the system, open the OS/2 System folder.
- (B5) Open the System Setup folder.
- (B6) Open the Display Driver Install Object.
- (B7) When the **Display Driver Install** window appears, select **PRIMARY DISPLAY**, and click **OK**.
- (B8) When the **Primary Display Driver List** window appears, select **Chips and Technologies 65550/554** from the list of **Adapter Types**.

Software Configuration

(B9) Select **OK** to install the video driver.

(B10) When installation is complete, you must shut down and restart the system for the changes to take effect. And also make sure to remove the install Disk#2 before restarting the system.

3-2. Flash BIOS Update

3-2-1. System BIOS Update:

BIOS updates are revised versions of the BIOS that have been modified to remedy known bugs. Use the program “Awdflash.exe” on Utility Disk#1 to update the system BIOS and the VGA BIOS. Users should check periodically with MultiTech to see if a new flash BIOS update is available.

3-3. Watchdog Timer Configuration

The watchdog timer does not run constantly. It must be started in DOS Debug mode or from another application program, customized for this purpose, that runs on the system. The watchdog timer is especially useful for remote rebooting of the PC.

The watchdog timer is defined at I/O port **0443H**. To enable the watchdog timer, write I/O port **0443H**, then the system will reset itself. To disable the function, write I/O port **0441H** and the system will stop the Watchdog timer.

Since the timer’s intervals have a tolerance of 25%, you should specify that the timer be refreshed about once every second. To program your watch timer, follow these steps:

Watchdog enable program:

Software Configuration

```
MOV                AX,000FH
(chOOSE the values you need; start from 0)
MOV                DX,0443H
OUT                DX,AX
```

Watchdog disable program:

```
MOV                AX,000FH
(this value can be ignored)
MOV                DX,0441H
OUT                DX,AX
```

The Watchdog Timer control table is as follows:

Level	Value	Time/sec	Level	Value	Time/sec
1	F	0	9	7	16
2	E	2	10	6	18
3	D	4	11	5	20
4	C	6	12	4	22
5	B	8	13	3	24
6	A	10	14	2	26
7	9	12	15	1	28
8	8	14	16	0	30

Software Configuration

Chapter 4

Green PC Function

The CommPlete 4000 is equipped with a “green function” that allows it to operate using reduced electrical power when the machine is inactive. When in green mode, the CommPlete 4000 slows down and shuts down certain computer functions in order to reduce power consumption. There are three reduced-power operating modes (presented in order of increasing power savings):

- (1) CPU Doze Mode,
- (2) System Standby Mode,
- (3) System Suspend Mode .

By default, however, the green function is turned off.

4-1. Power Saving Block Diagram

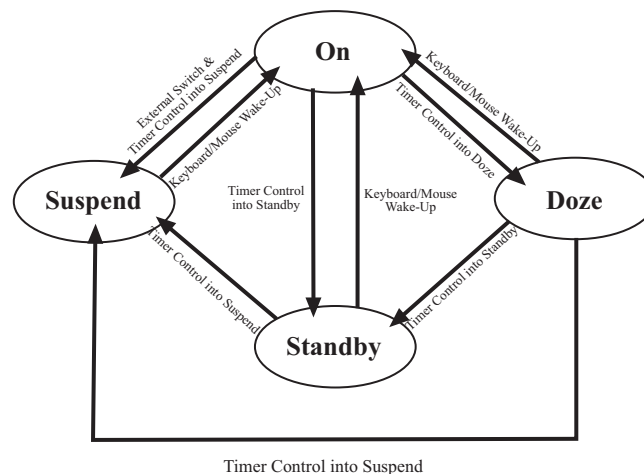


Figure 4-1: “Power On” & Three Reduced-Power States

4-2. CPU Doze Mode

1. After a pre-determined period of inactivity has elapsed, the CPU will slow down to 8 MHz.
2. The computer will emit one 'beep' sound.
3. The green function will monitor PC activity according to settings in the Power Management Setup screen.
4. If any activity occurs, the system will switch from "Doze Mode" to "On Mode."

4-3. System Standby Mode

1. After a pre-determined period of inactivity has elapsed, the CPU will slow down to 8 MHz.
2. The computer will emit two beeps.
3. The Level 1 cache will be disabled.
4. The VGA monitor will display a blank screen.
5. The hard drive will be powered down.
6. If any activity occurs, the system will switch from "Doze Mode" to "On Mode."

4-4 System Suspend Mode

1. After a pre-determined period of inactivity has elapsed, the CPU will slow down to 8 MHz.
2. The computer will emit three beeps.
3. The Level 2 cache will be disabled.
4. The VGA monitor will display a blank screen.
5. The hard drive will be powered down.
6. The green function will monitor PC activity according to settings in the Power Management Setup screen.
7. When the system is in Suspend Mode, input from the keyboard, or the mouse, or alarm is required to wake up the PC.

Chapter 5

Award BIOS Setup

5.1 Introduction

This chapter describes the function of the BIOS in managing the features of your system and how to configure the BIOS in its Setup Menu. The IPC-551 single-board computer is equipped with a system BIOS chipset from Award Software Inc.

Your application programs (such as word processing, spreadsheets, and games) rely on an operating system such as DOS or OS/2 to manage such things as keyboard, monitor, disk drives, and memory.

The operating system, in turn, relies on a BIOS (Basic Input and Output system), a program stored on a ROM (Read-only Memory) chip, to initialize and configure your computer's hardware. As the interface between the hardware and the operating system, the BIOS enables you to make basic changes to your system's hardware without having to write a new operating system.

The following diagram illustrates the interlocking relationships between the system hardware, BIOS, operating system, and an application program:

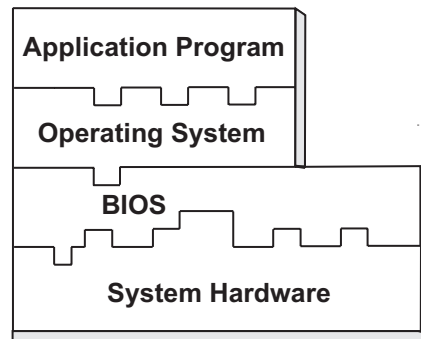


Figure 5-1: PC Subsystem Relationships

Award BIOS Setup

The Setup program built into the Award BIOS lets users modify the basic system configuration. This special configuration information is then stored in battery-backed RAM so that the PC retains the Setup information when the power is turned off.

The Award BIOS is a custom version of an industry standard BIOS. It supports Intel/Cyrix/AMD processors in a standard IBM-AT compatible input/output system. The BIOS provides critical low-level support for standard devices such as disk drives and serial and parallel ports.

The Award BIOS has been customized by adding important, but non-standard, features such as virus and password protection as well as special support for detailed fine-tuning of the chipset that controls the entire PC system.

Descriptions in this chapter will help you configure your system using the BIOS Setup screens.

Note: MultiTech has pre-set the BIOS before shipping the CommPlete 4000. In most cases, the user will not need to change any BIOS settings. However, if any hardware within the CommPlete 4000 has been changed, or if the boot sequence has been changed, the user will need to revise the BIOS accordingly.

5-2 Entering Setup

To enter the BIOS Setup screen, power on the computer and then press the Delete key immediately. The other way to enter Setup is to power on the computer and then, when the below message appears briefly at the bottom of the screen during the POST (Power On Self Test), press the Delete key or simultaneously press <Ctrl>, <Alt>, and <Esc> keys (Control, Alternate, & Escape).

TO ENTER SETUP BEFORE BOOT PRESS <CTRL-ALT-ESC> OR
 KEY

As long as the above message is present on the screen you may press the key (the one that shares the decimal point at bottom of the number keypad) to access the Setup program. After a moment, the main menu of the Award SETUP program will appear on the screen:

ROM / PCI / ISA BIOS (2A59FP6C) CMOS SETUP UTILITY AWARD SOFTWARE, INC.	
STANDARD CMOS SETUP	INTERGRATED PERIPHERALS
BIOS FEATURES SETUP	PASSWORD SETTING
CHIPSET FEATURES SETUP	IDE HDD AUTO DETECTION
POWER MANAGEMT SETUP	HDD LOW LEVEL FORMAT
PNP/PCI CONFIGURATION	SAVE & EXIT SETUP
LOAD BIOS DEFAULTS	EXIT WITHOUT SAVING
LOAD SETUP DEFAULTS	
Esc: Quit F10: Save & Exit Setup	↑↓→← :SELECT ITEM (Shift) F2: Change Color
Time, Date, Hard Disk Type	

Figure 5-2: Setup Program Initial Screen

5.2.1 Setup Keyboard Commands

A common set of keyboard commands is used for all BIOS-related screens. For example, you may use the cursor up/down keys to highlight the individual menu items. As you highlight each item, a brief description of that item's function will appear in the lower window. If you have a color monitor you can use the Shift F2 keys to scroll through the various color combinations available.

In general, you use the arrow keys to highlight items and then press **Enter** to select. Use the **PageUp** and **PageDown** keys to change entries. Press **F1** for help. Press **Esc** to quit. The following table provides more detail about how to navigate in the Setup program using the keyboard.

Up arrow	Move to previous item
Down arrow	Move to next item
Left arrow	Move to the item in the left hand
Right arrow	Move to the item in the right hand
Esc key	Main Menu — Quit but do not save changes into CMOS

Award BIOS Setup

Submenu	Exit current page and return to Main Menu
PgUp key	Increase the numeric value or make changes
PgDn key	Decrease the numeric value or make changes
+ key	Increase the numeric value or make changes
- key	Decrease the numeric value or make changes
F1 key	General help
(Shift)F2	Change color from total 16 colors. F2 selects key color forward, Shift-F2 selects color backwards.
F4 key	Reserved
F5 key	Restore the previous CMOS value from CMOS
F6 key	Load the default CMOS value from BIOS default table
F7 key	Load the default value of the parameter
F8 key	Reserved
F9 key	Reserved
F10 key	Save all the CMOS changes, only for Main Menu

5-3 Standard CMOS Setup Menu

Highlight STANDARD CMOS SETUP and press <ENTER> . The following screen display will appear:

ROM PCI / ISA BIOS (2A59FP6C)									
STANDARD CMOS SETUP									
AWARD SOFTWARE, INC.									
Date (mm:dd:yy)		: Fri, Sep 5 1997							
Time (hh:mm:ss)		: 10 : 17 : 37							
		Land-							
	Type	Size	Cyls.	Heads	PreComp	zone	Sectors	Mode	
Primary Master	:Auto	0	0	0	0	0	0	:Auto	
Primary Slave	:Auto	0	0	0	0	0	0	:Auto	
Secondary Master	:Auto	0	0	0	0	0	0	:Auto	
Secondary Slave	:Auto	0	0	0	0	0	0	:Auto	
Drive A: 1.44M, 3.5in.					Base Memory:		640K		
Drive B: None					Extended Memory:		31744K		
					Other Memory:		384K		
Video: EGA/VGA									
Halt On: All Errors									
					Total Memory:		32768K		
Esc: Quit		↑↓←→: SELECT ITEM		Pu/Pd/+/-: Modify					
F1: Help		(Shift) F2: Change Color							

Figure 5-3: Standard CMOS Setup Screen

In the above table the base memory size and the extended memory size are displayed. This is automatically read from your system. You do not need to set these parameters. The screen displays the date and time, which the operator must set correctly after powering up the computer. The format of the date/time display is as follows:

Date:

< Month >, < Date > and < Year >. Ranges for each value are in the CMOS Setup Screen, and the week-day will be skipped skip automatically.

Time:

< Hour >, < Minute >, and < Second >. Use 24 hour clock format, i.e., for "p.m." numbers, add 12 to the hour. For example, 4: 30 p.m. should be expressed as 16:30:00.

Drives: Primary Master/Slave & Secondary Master/Slave

In general, the IPC-551 can handle four disk drives: a primary master, a primary slave, a secondary master, and a secondary slave. The hard drive shipped with the CommPlete 4000 will be a "Primary Master" drive designated as Drive C. An IDE CDROM may optionally function

Award BIOS Setup

as a Primary Slave drive and be designated as Drive D. The “type” and “mode” settings for the primary master and the primary slave drives should, in most cases, be AUTO. The default configuration state for the secondary master/slave is DISABLED.

When this field of the Standard CMOS Setup screen is set to AUTO, the IPC-551 will automatically detect the hard drive(s) in the system. The IPC-551 can auto-detect 45 specific drive types (designated 1-45 in this field).

The drive type can also be entered manually. If entered manually, the drive in use must match the type entered in this field. If the drive being used is not of the type specified in this field, it will not work properly in the CommPlete 4000. For drives not on the list of 45 types, a user-defined drive can also be specified in this field (as type “User”). When “User” is selected for this field, the operator must specify the parameters of the hard drive (number of cylinders, heads, etc.). This information should be provided in the documentation for the hard drive unit (this information is often specified on the exterior of the hard drive unit, as well).

Note: If your IPC-551 has trouble detecting your hard drive when the Type field in the Standard CMOS Setup screen is set to AUTO, then you should enable the IDE HDD Auto Detection function in the CMOS Setup Utility screen. If the hard drive is still not detected, designate the Type as User and enter the hard-drive values into the Standard CMOS Setup screen

If the controller of the hard-disk drive interface is ESDI, the selection shall be

“Type 1”.

If the controller of the hard-disk drive interface is SCSI, the selection shall be “None”

If the controller of the hard-disk drive interface is CD-ROM, the selection shall be “None”

Type:

Describes the hard drive. Default value is AUTO. Other values: 1-45, user, and none.

CYLS.:

Denotes the number of cylinders in the specified drive type.

HEADS:

Denotes the number of heads in the specified drive type.

PRECOM:

Precom is the read delay circuitry which takes into account the timing differences between the inner and outer edges of the surface of the disk platter. The number designates the starting cylinder of the signal.

LZONE:

Lzone is the landing zone of the heads. This number determines the cylinder location where the heads will normally park when the system is shut down.

SECTORS:

Denotes the number of sectors in the specified drive type.

Size (Capacity):

Denotes the formatted capacity of the drive based on the following formula: (# of heads) X (# of cylinders) X (# of sets) X (512bytes/sects)

Drive A and Drive B:

The options are 360KB 5.25in, 1.2KB 5.25in, 720KB 3.5in, 1.44MB 3.5in, 2.88MB 3.5in and None. Not Installed could be used as an option for workstations without disk drives.

Award BIOS Setup

Video:

Options are Monochrome, Color 40, VGA/EGA (default), Color 80.

Halt On:

Options are *No Errors*, *All but Keyboard*, *All but Diskette*, *All but Diskette/Keyboard*, *All Errors*. Default is *No Errors*.

Hard Disk Attributes:

Type	Cylinders	Heads	V-P comp	LZone	Sect	Capacity
1	306	4	128	305	17	10
2	615	4	300	615	17	20
3	615	6	300	615	17	30
4	940	8	512	940	17	62
5	940	6	512	940	17	46
6	615	4	65535	615	17	20
7	642	8	256	511	17	30
8	733	5	65535	733	17	30
9	900	15	65535	901	17	112
10	820	3	65535	820	17	20
11	855	5	65535	855	17	35
12	855	7	65535	855	17	49
13	306	8	128	319	17	20
14	733	7	65535	733	17	42
15	000	0	0000	000	00	00
16	612	4	0000	663	17	20
17	977	5	300	977	17	40
18	977	7	65535	977	17	56
19	1024	7	512	1023	17	59
20	733	5	300	732	17	30
21	733	7	300	732	17	42
22	733	5	300	733	17	30
23	306	4	0000	336	17	10
24	977	5	65535	976	17	40
25	1024	9	65535	1023	17	76
26	1224	7	65535	1223	17	71
27	1224	11	65535	1223	17	111
28	1224	15	65535	1223	17	152
29	1024	8	65535	1023	17	68
30	1024	11	65535	1023	17	93
31	918	11	65535	1023	17	83
32	925	9	65535	926	17	69
33	1024	10	65535	1023	17	85
34	1024	12	65535	1023	17	102
35	1024	13	65535	1023	17	110
36	1024	14	65535	1023	17	119
37	1024	2	65535	1023	17	17
38	1024	16	65535	1023	17	136
39	918	15	65535	1023	17	114
40	820	6	65535	820	17	40
41	1024	5	65535	1023	17	42
42	1024	5	65535	1023	26	65
43	809	6	65535	852	17	40
44	809	6	65535	852	26	61
45	776	8	65535	775	33	100
47			AUTO			

Figure 5-4: Award Hard Disk Type Table

5-4 BIOS Features Setup Menu

The BIOS FEATURES SETUP menu presents configuration options for the support chipset and the shadowing of RAM. When you select BIOS FEATURES SETUP in the *CMOS Setup Utility* menu, this screen appears:

ROM / PCI / ISA BIOS (2A59FP6C) BIOS FEATURES SETUP AWARD SOFTWARE, INC.			
Virus Warning	:Disabled	Video BIOS Shadow	:Enabled
CPU Internal Cache	:Enabled	C8000-CBFFF Shadow	:Disabled
External Cache	:Enabled	CC000-CFFFF Shadow	:Disabled
Quick Power-On Self-Test	:Disabled	D000-D3FFF Shadow	:Disabled
Boot Sequence	:A, C, SCSI	D4000-D7FFF Shadow	:Disabled
Swap Floppy Drive	:Disabled	D8000-DBFFF Shadow	:Disabled
Boot-Up Floppy Seek	:Enabled	DC000-DFFFF Shadow	:Disabled
Boot-Up Numlock Status	:ON		
Boot-Up System Speed	:High		
Gate A20 Option	:Fast		
Typematic Rate Setting	:Disabled		
Typematic Rate (char/sec)	:6		
Typematic Delay (msec)	:250		
Security Option	:Setup		
PCI/VGA prelatial snoop	:Disabled		
OS Select for DRAM>64Mb	:Non-OS2		
Esc: Quit ↑↓ → ← : SELECT ITEM			
F1: Help Pu/Pd/+/=: Modify			
F5: Old Values (Shift) F2: Color			
F6: Load BIOS Defaults			
F7: Load Setup Defaults			

Figure 5-5: BIOS Features Setup

The parameters accessible on this screen govern the system’s default speed, boot-up sequence, keyboard operation, shadowing and security.

Note: MultiTech presets all BIOS features before shipping the CommPlete 4000. BIOS features should not be changed except by expert operators.

Virus Warning

When this item is enabled, the Award BIOS will monitor the boot sector and partition table of the hard disk drive for any attempt at

modification. If an attempt is made, the BIOS will halt the system and the following error message will appear.

! WARNING !

Disk boot sector is to be modified
Type Y to accept write or N to abort write
Award Software, Inc.

Afterwards, if necessary, you will be able to run an anti-virus program to locate and remove the problem before any damage is done.

Enabled	Activates automatically when the system boots up. Causes a warning message to appear when anything attempts to access the boot sector or hard disk partition table.
Disabled	No warning message will appear when anything attempts to access the boot sector or hard disk partition table. (Default.)

NOTE: Many disk diagnostic programs which attempt to access the boot sector table can cause the above warning message. If you will be running such a program, we recommend that you disable Virus Protection beforehand. When enabled, this feature can cause problems when installing Windows 95.

CPU Internal Cache/External Cache

These two settings affect memory access speed, generally increasing access speed when enabled. The default value is Enabled.

Enabled	Enable cache
Disabled	Disable cache

Quick Power On Self Test

This setting affects the duration of the Power On Self Test (POST), which occurs after you power up the computer. If enabled, the BIOS will shorten or skip some 'check items' during the POST.

Enabled	Enable quick POST (Default)
Disabled	Normal POST

Award BIOS Setup

Boot Sequence

This setting determines which drive to search first for booting files at startup. The default value is C, A.

C, A System will first search for hard disk drive then floppy disk drive.

A, C System will first search for floppy disk drive then hard disk drive.

Boot Up Floppy Seek

During POST, BIOS will determine if the floppy disk drive installed has 40 or 80 tracks. 360K type has 40 tracks while 760K, 1.2M and 1.44M are all 80 tracks.

Enabled BIOS searches for floppy disk drive to determine if it is 40 or 80 tracks. Note that BIOS can not tell from 720K, 1.2M or 1.44M drive type as they are all 80 tracks (Default).

Disabled BIOS will not search for the type of floppy disk drive by track number. Note that there will not be any warning message if the drive installed is 360K.

Boot Up NumLock Status

This allows you to determine the default state of the numeric keypad. By default, the system boots up with NumLock on.

On Keypad's number keys are active.

Off Keypad's arrow keys are active.

Boot Up System Speed

Selects the default system speed — the normal operating speed at power up.

High Sets the speed to high (default)

Low Sets the speed to low

Regardless of which setting is chosen, the operator can still use the turbo switch to toggle between High and Low modes during operation.

Gate A20 Option

This entry allows you to select how gate A20 is handled. Gate A20 is a device used to address memory above 1 Mbyte. Initially, Gate A20 was handled by a pin on the keyboard. Today, while keyboards still provide this support, it is more common, and much faster, for the system chipset to provide support for gate A20.

Normal keyboard (default)

Fast chipset

Typematic Rate Setting

Enable the “typematic” function if you want to be able to configure the key-repetition characteristics of your keyboard. When typematic is disabled, continually holding down a key on your keyboard will generate only one instance. In other words, the BIOS will only report that the key is down. When the typematic rate is enabled, the BIOS will report as before, but it will then wait a moment, and, if the key is still down, it will begin the report that the key has been depressed repeatedly. For example, you would use such a feature to accelerate cursor movements with the arrow keys.

Enabled Enable typematic rate

Disabled Disable typematic rate (default)

Typematic Rate (Chars/Sec)

When the typematic rate is enabled, the “typematic rate” selection allows you select the rate at which a ‘held-down’ key will produce “acceleration.” Acceleration refers to multiple instances of a character (letter, number, or symbol) or other multiple keyboard effects (like cursor movement with arrow keys and character removal with the Delete keys).

- 6 6 characters per second (default)
- 8 8 characters per second
- 10 10 characters per second
- 12 12 characters per second
- 15 15 characters per second
- 20 20 characters per second
- 24 24 characters per second
- 30 30 characters per second

Typematic Delay (Msec)

When the typematic rate is enabled, this selection allows you to select the delay between when the key is first depressed and when the acceleration begins.

- 250 250 msec (default)
- 500 500 msec
- 750 750 msec
- 1000 1000 msec

Security Option

Allows you to limit access to the computer system or to the BIOS Setup menus. When System security is enabled, the system will not boot and access to Setup will be denied if the correct password is not entered at the prompt. When Setup security is enabled, the system will boot, but access to Setup will be denied if the correct password is not entered at the prompt.

System security	boot & BIOS access require password
Setup security	BIOS access requires password (default)

***Note:** To disable security, select **PASSWORD SETTING** at the **CMOS Setup Utility** menu. You will be asked to enter a password. Do not type anything; just press **Enter**, and security will be disabled. Once it's disabled, the system will boot and you can enter **Setup** freely.*

Video BIOS Shadow

Determines whether the video BIOS will be copied to RAM. However, it is optional depending on chipset design. Video Shadow will increase the video speed.

Enabled Video shadow is enabled (default)

Disabled Video shadow is disabled

C8000 - CFFFF Shadow/DC000 - DFFFF Shadow

Determines whether option ROMs will be copied to RAM or not. An example of such option ROM would be support of on-board SCSI hard-drive functionality.

Enabled Optional shadow is enabled

Disabled Optional shadow is disabled (Default)

5-5 Chipset Features Setup

This menu lets you configure the system based on the specific features of the installed chipset. This chipset manages bus speeds and access to system memory resources, such as DRAM and the external cache. It also coordinates communications between the conventional ISA bus and the PCI bus. However, these parameters should never need to be altered. The default settings have been chosen because they provide the best operating conditions for your system. The only time you might consider making any changes would be if you discovered that data was being lost while using your system.

If you choose **CHIPSET FEATURES SETUP** from the *CMOS Setup Utilities* menu, the following screen appears.

ROM / PCI / ISA BIOS (2A59FP6C) BIOS FEATURES SETUP AWARD SOFTWARE, INC.			
Auto Configuration	:Enable	Memory Parity / ECC Check	:Auto
DRAM Timing	:70 ns	Single Bit Error Report	:Enabled
DRAM RAS# Precharge Time	:4	L2 Cache Cacheable Size	:64MB
DRAM R/W Leadoff Timing	:7/6	Chipset NA# Asserted	:Enabled
Fast RAS# to CAS# Delay	:3	Pipeline Cache Timing	:Faster
DRAM Read Burst (EDO/FPM)	:x333/x444	Passive Release	:Enabled
DRAM Write Burst Timing	:x333	Delayed Transaction	:Disabled
Turbo Read Leadoff	:Disabled		
DRAM Speculative Leadoff	:Disabled		
Turn-Around Insertion	:Disabled		
ISA Clock	:PCICLK/4		
System BIOS Cacheable	:Disabled		
Video BIOS Cacheable	:Disabled		
8-Bit I/O Recovery Time	:1		
16-Bit I/O Recovery Time	:1		
Memory Hole at 15M-16M	:Disabled		
Peer Concurrency	:Enabled		
Chipset Special Features	:Enabled		
DRAM ECC/Parity Select	:Parity		

Esc: Quit	↑↓→←: SELECT ITEM
F1: Help	Pu/Pd/+/-: Modify
F5: Old Values	(Shift) F2: Color
F6: Load BIOS Defaults	
F7: Load Setup Defaults	

Figure 5-6: Chipset Features Setup

By moving cursor to the desired field and pressing < F1 > key, all values for that field will be displayed.

Auto Configuration Function:

When this option is Enabled, the BIOS automatically configures cache and clock settings based on detection of the CPU clock speed. The user cannot change the other parameters. Set this option to `Disabled` to do manual setting of DRAM, cache, and I/O bus clock operating parameters. `Enabled` is default.

DRAM Settings

The first chipset settings deal with CPU access to dynamic random access memory (DRAM). The default timings have been carefully chosen and should only be altered if data is being lost. One data-loss scenario that relates to DRAM timing values occurs when the computer contains mixed-speed DRAM chips; greater delays may be required to preserve the integrity of the data held in the slower memory chips and, consequently, data may be lost.

ISA Clock:

Defines the clock value for the ISA bus. Usually, the ISA bus clock should be programmed to 8Mhz. For example, when the PCI clock is 33MHz, choose PCICLK/4. PCICLK/4 is the default value.

Cache Features

System BIOS Cacheable

When enabled, accesses to the system BIOS ROM addressed at F0000H-FFFFFH are cached.

Enabled	BIOS access cached
Disabled	BIOS access not cached

Disabled is the default.

Award BIOS Setup

Video BIOS Cacheable

As with caching the System BIOS above, enabling the Video BIOS cache will cause access to video BIOS addressed at C0000H to C7FFFH to be cached.

- Enabled Video BIOS access cached
 - Disabled Video BIOS access not cached
- Disabled is the default.

PCI and IDE Configuration

8 Bit I/O Recovery Time

The recovery time is the length of time, measured in CPU clock periods, that the system will delay after completing an input/output request. This delay occurs because the CPU operates much faster than the input/output bus and, therefore, the CPU must be delayed to allow for the completion of the I/O.

This setting determines the recovery time allowed for 8 bit I/O. Choices are from 1 to 8 CPU clock periods.

- 3 clock periods is the default setting.

16 Bit I/O Recovery Time

This setting determines the recovery time allowed for 16 bit I/O. Choices are from 1 to 4 CPU clock periods.

- 2 clock periods is the default setting.

Memory Hole At 15M-16M

In order to improve performance, certain space in memory can be reserved for ISA cards. This memory must be mapped into the memory space below 16 MB.

- Enabled memory hole supported
- Disabled memory hole not supported (default)

5-6 Power Management Setup

The Power Management Setup allows you to configure your system to save energy most effectively while still meeting your computing needs. When you specify “Max Saving,” all power-saving timeouts are set to their minimum value and power saving is implemented at the lowest possible threshold.

ROM / PCI / ISA BIOS (2A59FP6C) POWER MANAGEMENT SETUP AWARD SOFTWARE, INC.			
Power Management	:Disable	** Power-Down & Resume Events **	
PM Control by APM	:Yes	IRQ3 (COM 2)	:ON
Video Off Method	:V/H SYNC + Blank	IRQ4 (COM 1)	:ON
MODEM Use IRQ	:3	IRQ5 (LPT 2)	:ON
		IRQ6 (Floppy Disk)	:OFF
Doze Mode	:Disable	IRQ7 (LPT1)	:ON
Standby Mode	:Disable	IRQ8 (RTC Alarm)	:OFF
Suspend Mode	:Disable	IRQ9 (IRQ2 Redir)	:ON
HDD Power-Down	:Disable	IRQ10 (Reserved)	:ON
**Wake Up Events in Doze & Standby **		IRQ11 (Reserved)	:ON
		IRQ12 (PS/2 Mouse)	:ON
		IRQ13 (Co-Processor)	:ON
		IRQ14 (Hard Disk)	:ON
		IRQ15 (Reserved)	:ON
IRQ3 (Wake-Up Event)	:ON	Esc: Quit ↑↓→←: SELECT ITEM	
IRQ4 (Wake-Up Event)	:ON	F1: Help Pu/Pd/+/-: Modify	
IRQ8 (Wake-Up Event)	:ON	F5: Old Values (Shift) F2: Color	
IRQ12 (Wake-Up Event)	:ON	F6: Load BIOS Defaults	
		F7: Load Setup Defaults	

Figure 5-7: Power Management Setup

Power Management

This field lets you select the type (or degree) of power saving used. There are four modes of power management:

1. Doze Mode
2. Standby Mode
3. Suspend Mode
4. HDD Power Down

There are four selections for Power Management, three of which have fixed mode settings.

Disable (default) No power management. Disables all four modes

Award BIOS Setup

Min. Power Saving Minimum power management.

Doze Mode = 1hr.,
Standby Mode = 1 hr.,
Suspend Mode = 1hr., and
HDD Power Down = 15 min.

*Max. Power Saving Maximum power management — ONLY
AVAILABLE FOR SLCPUs.*

Doze Mode = 1 min.,
Standby Mode = 1 min.,
Suspend Mode = 1 min., and
HDD Power Down = 1 min.

User Defined. Allows you to set each mode individually. When not disabled, each of the ranges are from 1 min. to 1 hr. except for HDD Power Down which ranges from 1 min. to 15 min. (HDD can also be disabled).

PM Control APM

When enabled (YES), an Advanced Power Management device will be activated to enhance the *Maximum Power Saving* mode and to stop the CPU internal clock. The Advanced Power Management function operates only if *Maximum Power Saving* is enabled. When enabled (YES), the system BIOS will wait for APM's prompt before it enters any PM mode (*Doze, Standby* or *Suspend*). If APM is installed, and if a task is running and the timer has timed out, APM will not prompt the BIOS to employ *any* power saving mode.

Video Off Method

This determines how the monitor is blanked (V/H SYNC+Blank). This selection will cause the system to turn off the vertical and horizontal synchronization ports and write blanks to the video buffer (Blank Screen). This option only writes blanks to the video buffer.

*Note: Doze, Standby, and Suspend are configurable only when
User Defined power management has been selected.*

Doze Mode

This timeout setting determines how long the PC must be idle before entering *Doze* mode. Values range from 10 seconds to 2 hours. *Doze* mode can also be disabled. In *Doze* mode, the CPU clock runs at a slower speed while all other devices continue operating at full speed.

Standby Mode

This timeout setting determines how long the PC must be idle before entering *Standby* mode. Values range from 30 seconds to 2 hours. *Standby* can also be disabled. When *Standby* mode is engaged, the PC's hard drive and its video are turned off while all other devices continue operating at full speed.

Suspend Mode

This timeout setting determines how long the PC must be idle before entering *Suspend* mode. Values range from 30 seconds to 2 hours. *Suspend* can also be disabled. In *Suspend* mode, all devices except the CPU are shut off.

HDD Power Down

This timeout setting determines how long the PC must be idle before entering *HDD Power Down* mode. In *HDD Power Down* mode, the hard disk drive will be shut off but all other devices remain active.

5-7 PnP/PCI Configuration

If you choose PNP/PCI CONFIGURATION from the *CMOS Setup Utility* menu, the following screen will appear:

ROM / PCI / ISA BIOS (2A59FP6C) PNP/PCI CONFIGURATION AWARD SOFTWARE, INC.			
Resources Controlled by	:Manual	PCI IRQ Active by	:Level
Reset Configuration Data	:Disabled	PCI IDE IRQ Map to	:PCI-Auto
		Primary IDE INT#	:A
		Secondary IDE INT#	:B
		Onboard PCI SCSI Chip	:Enabled
		Used MEM base addr	:N/A
IRQ3 assigned to	:Legacy ISA		
IRQ4 assigned to	:Legacy ISA		
IRQ5 assigned to	:PCI/ISA PnP		
IRQ6 assigned to	:Legacy ISA		
IRQ7 assigned to	:PCI/ISA PnP		
IRQ8 assigned to	:PCI/ISA PnP		
IRQ9 assigned to	:PCI/ISA PnP		
IRQ10 assigned to	:PCI/ISA PnP		
IRQ11 assigned to	:PCI/ISA PnP		
IRQ12 assigned to	:PCI/ISA PnP		
IRQ13 assigned to	:PCI/ISA PnP		
IRQ14 assigned to	:PCI/ISA PnP		
IRQ15 assigned to	:PCI/ISA PnP		
DMA-1 assigned to	:PCI/ISA PnP		
DMA-3 assigned to	:PCI/ISA PnP		
DMA-5 assigned to	:PCI/ISA PnP		
DMA-6 assigned to	:PCI/ISA PnP		
DMA-7 assigned to	:PCI/ISA PnP		
		Esc: Quit	↑↓→←:SELECT ITEM
		F1: Help	Pu/Pd/+/-: Modify
		F5: Old Values	(Shift) F2: Color
		F6: Load BIOS Defaults	
		F7: Load Setup Defaults	

Figure 5-7: PNP/PCI Configuration

You can manually configure the Plug-and-Play/PCI Device's IRQ. The default setting is *Auto*.

PCI IRQ Activated by

This sets the method by which the PCI bus recognizes that an IRQ service is being requested by a device. Under all circumstances, you should retain the default configuration unless advised otherwise by your system's manufacturer.

Choices are *Level* (default) and *Edge*.

PCI IDE IRQ Map to

This allows you to configure your system to the type of IDE disk controller in use, ISA or PCI (default value is PCI Auto). PCI Auto allows the system to determine automatically how your IDE disk system is configured. Remember that this setting refers to the hard disk drive itself, rather than individual partitions. Since each IDE

controller supports two separate hard drives, you can select the interrupt number (the “INT#”; the possible values are A, B, C, or D) for each. Note that the primary drive always has a lower interrupt than the secondary drive.

Onboard PCI SCSI Chip

Default is *Disabled*. The IPC-551 SBC does not support SCSI.

5-8 Load BIOS Defaults

Auto Configuration with BIOS Defaults

Choosing LOAD BIOS DEFAULTS from the CMOS Setup Utility menu will restore default BIOS values to the PC. Invoking LOAD BIOS DEFAULTS will bring up this dialog box:

Load BIOS Default (Y ? N) ? Y

To use the BIOS defaults, change the prompt to “Y” and press *Enter* ; the default BIOS values will be loaded into CMOS automatically the next time you power up the IPC-551. *Load BIOS Defaults* are the same as *Load Setup Defaults*.

5-9 Load Setup Defaults

Auto Configuration with Setup Defaults

Choosing LOAD SETUP DEFAULTS from the CMOS Setup Utility menu will restore default SETUP values to the PC. Invoking LOAD SETUP DEFAULTS brings up this dialog box:

Load SETUP Default (Y ? N) ? Y

To use the SETUP defaults, change the prompt to “Y” and press *<Enter>*; the default SETUP values will be loaded into the CMOS automatically the next time you power up the IPC-551. *Load Setup Defaults* are the same as *Load BIOS Defaults*.

5-10 Integrated Peripherals

If you choose INTEGRATED PERIPHERALS from the CMOS Setup Utility menu, this screen will appear:

ROM / PCI / ISA BIOS (2A59FP6C) INTEGRATED PERIPHERALS AWARD SOFTWARE, INC.	
IDE HDD Block Mode :Enabled PCI Slot IDE 2nd Channel :Enabled On-Chip Primary PCI IDE :Enabled On-Chip Secondary PCI IDE :Enabled IDE Primary Master PIO :Auto IDE Primary Slave PIO :Auto IDE Secondary Master PIO :Auto IDE Secondary Slave PIO :Auto	
USB Controller :Enabled USE Keyboard Support :Disabled Onboard FDC Controller :Enabled Onboard UART 1 :Auto UART 1 operation mode :Standard	
Onboard UART 2 :Auto UART 2 operation mode :Standard	
Onboard Parallel Port :378/IRQ7 Parallel Port Mode :Normal	
Esc: Quit ↑↓→← :SELECT ITEM F1: Help Pu/Pd/+/-: Modify F5: Old Values (Shift) F2: Color F6: Load BIOS Defaults F7: Load Setup Defaults	

Figure 5-8: Integrated Peripherals

5-11 Password Setting

Access to the computer system in general or to the BIOS settings in particular can be put under password protection using this function. When you select PASSWORD SETTING on the *CMOS Setup Utility* menu, the following dialog box will appear at the center of the screen to assist you in creating a password.

Enter Password

Type the password, up to eight characters in length, and press **Enter**. The password typed now will clear any previously entered password from CMOS memory. You will be asked to confirm the password. Type the password again and press **Enter**. You may also press **Esc** to abort the selection and *not* enter a password.

Caution: Losing or forgetting your system password will render your computer unusable. Assign a password only if it is necessary for security purposes. Restoring access after loss of a password is nontrivial and requires the clearing and re-loading of BIOS settings. If a password is forgotten or lost, contact MultiTech Technical Support to establish a new password.

To disable a password, just press **Enter** when you are prompted to enter the password. A message will confirm that the password is to be disabled. Once the password has been disabled, the system will boot and you can enter Setup freely.

Password Disabled

When a password has been enabled, you will be prompted to enter it every time you try to enter Setup. This prevents an unauthorized person from changing any part of your system configuration.

Additionally, when a password is enabled, you can also require the BIOS to request a password every time your system is rebooted. This would prevent unauthorized use of your computer.

You determine when the password is required within the *BIOS Features Setup* menu and its Security option (presented earlier). If the Security option is set to *System*, the password will be required both at boot and at entry to Setup. If set to *Setup*, prompting only occurs when trying to enter Setup.

5-12 IDE HDD Auto Detection

The parameters presented on this menu are pre-set at the factory. They should be altered only by expert users.

This feature automatically detects and configures hard disk drive parameters. If you are uncertain of your hard disk drive's parameters, this feature will display them. Generally, the IDE HDD Auto Detection function is needed only if you change your hard disk drive.

When you select IDE HDD AUTO DETECTION from the *CMOS Setup Utility* menu, this screen will appear:

Award BIOS Setup

ROM / PCI / ISA BIOS (2A59FP6C) STANDARD CMOS SETUP AWARD SOFTWARE, INC.							
	CYLS.	HEADS	PRECOMP	LANDZONE	SECTORS	MODE	
Primary Master : (Mb)	0	0	0	0	0	-----	
Primary Slave :							
Secondary Master :							
Secondary Slave :							

Select Secondary Slave Option (N=Skip) :N

Option	Size	Cyls	Heads	Precomp	Landzone	Sectors	Mode
2(Y)	540	524	32	0	1048	63	LBA
1	541	1049	16	65535	1048	63	Normal
3	540	524	32	65535	1048	63	LARGE

Note: Some OSes (like SCO-UNIX) must use "Normal" for installation
Esc: Skip

Figure 5-9: IDE HDD Auto Detection Screen

Generally speaking, hard disk drives are categorized by size as follows:

Normal: HDD Size < 528MB

LBA: 528MB < HDD Size < 8.4 GB

Large: HDD Size > 8.4GB

If you specify a sub-standard mode for a hard disk drive when formatting, part of the drive will remain unformatted and therefore inaccessible. For example, if you format a 4GB hard disk drive as a Normal drive, only 528MB would be formatted and nearly 3.5GB would be unusable.

Auto Detection

The BIOS Setup will display all the possible modes that are supported by the HDD including NORMAL, LBA, & LARGE. The user can select the appropriate mode.

HDD Mode

The Award BIOS supports 3 HDD mode: NORMAL, LBA, & LARGE

NORMAL mode:

Generic access mode in which neither the BIOS nor the IDE controller will make any transformations during accessing.

The maximum number of cylinders, heads & sectors for NORMAL mode are 1024, 16, and 63.

	no. Cylinder	(1024)
x	no. Head	(16)
x	no. Sector	(63)
x	no. Bytes per Sector	(512)

Total: 528 megabytes

If the user sets the HDD to NORMAL mode, the maximum accessible HDD size will be 528 Megabytes even though its physical size may be greater than that.

LBA (Logical Block Addressing) mode:

This new HDD accessing method overcomes the 528 megabyte bottleneck. The number of cylinders, heads and sectors shown in Setup may not be the number physically contained in the HDD.

During HDD accessing, the IDE controller will transform the logical address described by the sector, head, and cylinder numbers into its own physical address inside the HDD.

The maximum HDD size supported by LBA mode is 8.4 gigabytes, which is obtained by the following formula:

	no. Cylinder	(1024)
x	no. Head	(255)
x	no. Sector	(63)

Award BIOS Setup

x no. of Bytes per Sector (512)

Total: 8.4 gigabytes

LARGE mode:

Some IDE HDDs contain more than 1024 cylinder without LBA support (in some cases, users do not want LBA). The BIOS provides another alternative to support these kinds of HDD.

CYLS	HEADS	SECTOR	MODE	—
1120	16	59	NORMAL	
560 32		59	LARGE	

The BIOS tricks DOS (or other OS) that the number of cylinders is less than 1024 by dividing it by 2. At the same time, the number of heads is multiplied by 2. A reverse transformation process will be made inside INT 13h in order to access the right HDD address.

Maximum HDD size in Large Mode:

	no. Cylinder	(1024)
x	no. Head	(32)
x	no. Sector	(63)
x	no. Per sector	(512)

Total: 1 gigabyte

Note: _Support of the LBA or LARGE mode of HDDs, requires some special software. All such software packages are located in the Award HDD Service Routine (INT 13h). If the PC is running under a Operating System that replaces the whole INT 13h, that PC may fail to access a HDD set to LBA or LARGE mode.

5-13 HDD Low Level Format

If you choose HDD LOW LEVEL FORMAT from the CMOS Setup Utility menu, the following screen will appear:

Hard Disk Low Level Format Utility				NO. CYLS HEAD	
----- SELECT DRIVE ----- ----- BAD TRACK LIST ----- ----- PREFORMAT ----- Current Select drive is : C					
DRIVE : C CYLINDER : 0 HEAD : 0					
	SIZE	HEAD	PRECOMP	LANDZ	SECTOR MODE
Primary Master	541	16	65535	1048	63 AUTO
Primary Slave	0	0	0	0	0 AUTO
Secondary Master	0	0	0	0	0 AUTO
Secondary Slave	0	0	0	0	0 AUTO
Up/Down - Select item Enter - Accept ESC - Exit / Abort Copyright (C) Award Software, Inc. 1992-94 All Rights Reserved					

Figure 5-10: HDD Low Level Format

Low-level formatting will sometimes remedy corrupt disk sectors. Unlike DOS formatting which can format disk partitions separately, Low-level formatting formats the entire physical hard disk drive. To invoke low-level formatting, select PREFORMAT and press **Enter**.

Caution: Low-level formatting will destroy all data on the hard disk drive. If you really want to reformat a hard disk drive, back up your data first.

5-14 Save & Exit Setup

When all required adjustments are complete, you must save these settings into the CMOS RAM. Select SAVE & EXIT SETUP and press **Enter**.

Award BIOS Setup

ROM / PCI / ISA BIOS (2A59FP6C) CMOS SETUP UTILITY AWARD SOFTWARE, INC.	
STANDARD CMOS SETUP	INTERGRATED PERIPHERALS
BIOS FEATURES SETUP	PASSWORD SETTING
CHIPSET FEATURES SETUP	IDE HDD AUTO DETECTION
POWER MANAGEMT SETUP	HDD LOW LEVEL FORMAT
PNP/PCI CONF	ETUP
LOAD BIOS DE	SAVE to CMOS and EXIT (Y/N)? N SAVING
LOAD SETUP DEFAULTS	
Esc: Quit F10: Save & Exit Setup	
↑↓→←:SELECT ITEM (Shift) F2: Change Color	
Save Data to CMOS & Exit SETUP	

Figure 5-11: Saving a CMOS Setup Configuration

When you confirm that you want to save the settings, your machine will automatically reboot and the changes you have made will be implemented. You can call up the setup program at any time to adjust any of the individual items by pressing the key during boot up.

To cancel any changes you have made, select QUIT WITHOUT SAVING (see figure below) and the original settings stored in CMOS will be retained.

ROM / PCI / ISA BIOS (2A59FP6C) CMOS SETUP UTILITY AWARD SOFTWARE, INC.	
STANDARD CMOS SETUP	INTERGRATED PERIPHERALS
BIOS FEATURES SETUP	PASSWORD SETTING
CHIPSET FEATURES SETUP	IDE HDD AUTO DETECTION
POWER MANAGEMT SETUP	HDD LOW LEVEL FORMAT
PNP/PCI CONF	ETUP
LOAD BIOS DE	QUIT Without Saving (Y/N)? Y SAVING
LOAD SETUP DEFAULTS	
Esc: Quit F10: Save & Exit Setup	
↑↓→←:SELECT ITEM (Shift) F2: Change Color	
Abandon All Data and Exit SETUP	

Figure 5-12: Exiting Setup Mode without Saving

Appendix A: Expansion Slots

This appendix presents the pin assignments for the PC-104 connector, the ISA bus, and the PCI bus.

PC-104 Connector Pin Assignment

104AB, 104CD: PC-104 Connector

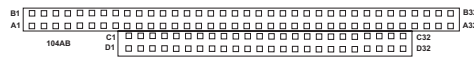


Figure A-1: PC104 Connector

The PC-104 can support multiple PC-104 modules. This card has two connectors : one (104AB) consists of 64 pins; the other one (104CD) consists of 40 pins, both are dual-in-line headers.

The pin assignments for connectors 104AB & 104CD are as follows:

104AB				104CD			
Pin	Assignment	Pin	Assignment	Pin	Assignment	Pin	Assignment
A1	IOCHK	B1	GND	C1	GND	D1	GND
A2	D7	B2	RESET	C2	SBHE	D2	MEMCS16
A3	D6	B3	VCC	C3	LA23	D3	IOCS16
A4	D5	B4	IRQ9	C4	LA22	D4	IRQ10
A5	D4	B5	-5V	C5	LA21	D5	IRQ11
A6	D3	B6	DRQ2	C6	LA20	D6	IRQ12
A7	D2	B7	-12V	C7	LA19	D7	IRQ15
A8	D1	B8	OWS	C8	LA18	D8	IRQ14
A9	D0	B9	+12V	C9	LA17	D9	DACK0
A10	IOCHRDY	B10	GND	C10	MEMR	D10	DRQ0
A11	AEN	B11	SMEMW	C11	MEMW	D11	DACK5
A12	A19	B12	SMEMR	C12	D8	D12	DRQ5
A13	A18	B13	IOW	C13	D9	D13	DACK6
A14	A17	B14	IOR	C14	D10	D14	DRQ6
A15	A16	B15	DACK3	C15	D11	D15	DACK7
A16	A15	B16	DRQ3	C16	D12	D16	DRQ7
A17	A14	B17	DACK1	C17	D13	D17	+5V
A18	A13	B18	DRQ1	C18	D14	D18	MASTER
A19	A12	B19	REFRESH	C19	D15	D19	GND
A20	A11	B20	CLK	C20	KEY PIN	D20	GND
A21	A10	B21	IRQ7				
A22	A9	B22	IRQ6				
A23	A8	B23	IRQ5				
A24	A7	B24	IRQ4				
A25	A6	B25	IRQ3				
A26	A5	B26	DACK2				
A27	A4	B27	T/C				
A28	A3	B28	BALE				
A29	A2	B29	VCC				
A30	A1	B30	OSC				
A31	A0	B31	GND				
A32	GND	B32	GND				

Figure A-2: PC-104 Pin Assignments

ISA Bus Pin Assignments

There are two edge connectors on this CPU Card. The one closest to the edge bracket is the ISA bus connector; the other is the PCI bus connector. The ISA-bus connector is divided into two sets : one consists of 62 pins; the other consists of 36 pins.

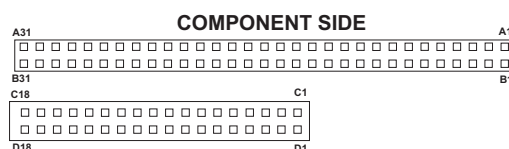


Figure A-3: ISA Bus Connector

The pin assignments are as follows:

Pin	Assignment	Pin	Assignment	Pin	Assignment	Pin	Assignment
B1	GND	A1	-IOCHK	D1	-MEMCS16	C1	SBHE
B2	RESET	A2	SD07	D2	-IOCS16	C2	LA23
B3	VCC	A3	SD06	D3	IRQ10	C3	LA22
B4	IRQ9	A4	SD05	D4	IRQ11	C4	LA21
B5	-5V	A5	SD04	D5	IRQ12	C5	LA20
B6	DRQ2	A6	SD03	D6	IRQ15	C6	LA19
B7	-12V	A7	SD02	D7	IRQ14	C7	LA18
B8	OWS	A8	SD01	D8	-DACK0	C8	LA17
B9	+12V	A9	SD00	D9	DRQ0	C9	MEMR
B10	GND	A10	-IOCHRDY	D10	-DACK5	C10	MEMW
B11	-SMEMW	A11	AEN	D11	DRQ5	C11	SD08
B12	-SMEMR	A12	SA19	D12	-DACK6	C12	SD09
B13	-IOW	A13	SA18	D13	DRQ6	C13	SD10
B14	-IOR	A14	SA17	D14	-DACK7	C14	SD11
B15	-DACK3	A15	SA16	D15	DRQ7	C15	SD12
B16	-DRQ3	A16	SA15	D16	+5V	C16	SD13
B17	-DACK1	A17	SA14	D17	-MASTER	C17	SD14
B18	-DRQ1	A18	SA13	D18	GND	C18	SD15
B19	-REFRESH	A19	SA12				
B20	BCLK	A20	SA11				
B21	IRQ7	A21	SA10				
B22	IRQ6	A22	SA09				
B23	IRQ5	A23	SA08				
B24	IRQ4	A24	SA07				
B25	IRQ3	A25	SA06				
B26	-DACK2	A26	SA05				
B27	T/C	A27	SA04				
B28	BALE	A28	SA03				
B29	+5V	A29	SA02				
B30	OSC	A30	SA01				
B31	GND	A31	SA00				

Figure A-4: ISA Bus Pin Assignments

PCI Bus Pin Assignments

Like the ISA-BUS connector, the PCI-BUS edge connector is also divided into two parts: one consists of 98 pins; the other consists of 22 pins. The standard of PCI-MG 32-bit PCI-ISA connector contains 218 pins in total.

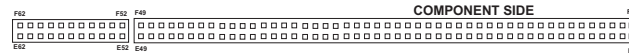


Figure A-5: PCI Bus Connector

The pin assignments are as follows:

F	E	F	E
Pin Assignment	Pin Assignment	Pin Assignment	Pin Assignment
F1 -12V	E1 TRST#	F31 +3.3V	E31 AD18
F2 TCK	E2 +12V	F32 AD17	E32 AD16
F3 GND	E3 TMS	F33 C/BE2#	E33 +3.3V
F4 TDO	E4 TDI	F34 GND	E34 FRAME#
F5 +5V	E5 +5V	F35 IRDY#	E35 GND
F6 +5V	E6 INTA#	F36 +3.3V	E36 TRDY#
F7 INTB#	E7 INTC#	F37 DEVSEL#	E37 GND
F8 INTD#	E8 +5V	F38 GND	E38 STOP#
F9 REQ3#	E9 CLKC	F39 LOCK#	E39 +3.3V
F10 REQ1#	E10 +5V(I/O)	F40 PERR#	E40 SDONE
F11 GNT3#	E11 CLKD	F41 +3.3V	E41 SB0#
F12 GND	E12 GND	F42 SERR#	E42 GND
F13 GND	E13 GND	F43 +3.3V	E43 PAR
F14 CLKA	E14 GNT1#	F44 C/BE1#	E44 AD15
F15 GND	E15 RST#	F45 AD14	E45 +3.3V
F16 CLKB	E16 +5V(I/O)	F46 GND	E46 AD13
F17 GND	E17 GNT0#	F47 AD12	E47 AD11
F18 REQ0#	E18 GND	F48 AD10	E48 GND
F19 +5V(I/O)	E19 REQ2#	F49 GND	E49 AD09
F20 AD31	E20 AD30	F52 AD08	E52 C/BE0#
F21 AD29	E21 +3.3V	F53 AD07	E53 +3.3V
F22 GND	E22 AD28	F54 +3.3V	E54 AD06
F23 AD27	E23 AD26	F55 AD05	E55 AD04
F24 AD25	E24 GND	F56 AD03	E56 GND
F25 +3.3V	E25 AD24	F57 GND	E57 AD02
F26 C/BE3#	E26 GNT2#	F58 AD01	E58 AD00
F27 AD23	E27 +3.3V	F59 +5V(I/O)	E59 +5V(I/O)
F28 GND	E28 AD22	F60 ACK64#	E60 REQ64#
F29 AD21	E29 AD20	F61 +5V	E61 +5V
F30 AD19	E30 GND	F62 +5V	E62 +5V

Figure A-6: PCI Pin Assignments

Appendix A: Expansion Bus

Appendix B: Technical Summary

This appendix presents mappings of six parameter sets:

Interrupts

RTC & CMOS RAM Assignments

Timer Channels

DMA Channels

Memory Functions

Input/Output Functions

Table B-1: Interrupt Map

IRQ	Assignment
0	System TIMER interrupt from Timer-0
1	Keyboard output buffer full
2	Cascade for IRQ 8-15
3	Serial Port 2
4	Serial Port 1
5	Parallel Port 2
6	Floppy Disk Adapter
7	Parallel Port 1
8	RTC Clock
9	Available
10	Available
11	Available
12	Available
13	Math Co-Processor
14	Hard Disk Adapter
15	Available

Table B-2: RTC & CMOS Map

Appendix B: Technical Summary

Code	Assignment
00	Seconds
01	Second Alarm
02	Minutes
03	Minute Alarm
04	Hours
05	Hours Alarm
06	Day of Week
07	Day of Month
08	Month
09	Year
0A	Status Register A
0B	Status Register B
0C	Status Register C
0D	Status Register D
0E	Diagnostic Status Byte
0F	Shutdown Byte
10	Floppy Disk Drive Type Byte
11	Reserved
12	Hard Disk Drive Type Byte
13	Reserved
14	Equipment Byte
15	Base Memory Low Byte
16	Base Memory High Byte
17	Extension Memory Low Byte
18	Extension Memory High Byte
30	Reserved for Extension Memory Low Byte
31	Reserved for Extension Memory High Byte
32	Date Century Byte
33	Information Flag
34-3F	Reserved
40-7F	Reserved for Chipset Setting Data

Appendix B: Technical Summary

Table B-3: Timer Channels Map

Timer Channel	Assignment
0	System Timer Interrupt
1	DRAM Refresh Request
2	Speaker Tone Generator

Table B-4: DMA Channels Map

DMA Channel	Assignment
0	Available
1	IBM SDLC
2	Floppy Disk Adapter
3	Channel 3; available
4	Cascade for DMA Controller 1
5	Available
6	Available
7	Available

Table B-5: Memory Map

Appendix B: Technical Summary

Memory Map	Assignment
0000000-009FFFF	System memory used by DOS and application.
00A0000-00BFFFF	Display buffer memory for VGA/EGA/CGA/ monochrome adapter.
00E0000-00EFFFF	Reserved for PCI device ROM
00F0000-00FFFFFF	System BIOS ROM
0100000-FFFFFFF	System extension memory

Table B-6: I/O Map

I/O Map	Assignment
000-01F	DMA Controller (Master)
020-021	Interrupt Controller (Master)
022-023	Chipset Controller: Registers, I/O Ports
040-05F	Timer Control Registers
060-06F	Keyboard Interface Controller (8042)
070-07F	RTC Ports & CMOS I/O Ports
080-09F	DMA Register
0A0-0BF	Interrupt Controller (slave)
0C0-0DF	DMA Controller (slave)
0F0-0FF	Math Co-Processor
1F0-1F8	Hard Disk Controller
278-27F	Parallel Port 2
2B0-2DF	Graphics Adapter Controller
2F8-2FF	Serial Port 2
360-36F	Network Ports
378-37F	Parallel Port 1
3B0-3BF	Monochrome & Printer Adapter
3C0-3CF	EGA Adapter
3D0-3DF	CGA Adapter
3F0-3F7	Floppy Disk Controller
3F8-3FF	Serial Port 1

Appendix C: Troubleshooting

C-1 Introduction

This appendix outlines errors that may occur during system operation and likely remedies for these problems.

C-2 Troubleshooting with Error Messages

This section describes error messages and their use in troubleshooting. Since many errors can be caused by poor cable connections, you should verify that all cables have been connected firmly to their proper receptacles. If error messages persist after the recommended adjustments have been made, contact MultiTech Systems for maintenance.

Post Beep: The BIOS generates two beeping (audible) error codes.

- (1) A single long beep followed by three short beeps indicates that a video error has occurred and the BIOS cannot initialize the video screen to display any additional information.
- (2) A single long beep sounded repeatedly indicates that a DRAM error has occurred.

CMOS Battery Failure: If the CMOS battery is low or dead, it should be replaced. The battery is located inside the real-time clock chip. Replacement requires soldering. The user should return the IPC-551 to MultiTech Systems for repair if the clock fails.

CMOS Checksum Error: This error indicates that the CMOS has been corrupted. Corruption may be caused by a weak battery.

Display Switch Is Set Incorrectly: The display switch on the motherboard can be set to either monochrome or color. This error

Appendix B: Technical Summary

message indicates that the switch setting does not match the video display mode specified in the **Setup** screen. Determine which setting is correct. Then either turn off the system and change the jumper, or enter **Setup** and change the entry in the “Video” field.

Disk Boot Failure: When you can’t find the boot device, insert a system disk into Drive A and press < Enter >. Make sure that the controller and the cables are in their proper positions and that the hard disk drive has been formatted correctly. Then reboot the system.

Diskette Drives Or Types Mismatch Error: When the diskette drive type is different from the settings specified in CMOS (BIOS Setup), run Setup and re-configure the drive.

Error Encountered Initializing Hard Drive: If you cannot initialize the hard drive, check that the adapter has been installed correctly and that all cables are correctly and firmly attached. Also be sure the correct hard-drive type has been selected in the BIOS Setup.

Error Initializing Hard Disk Controller: When this error occurs, check to see that the cable connecting the hard drive to the motherboard is seated properly in its receptacle. Make sure the correct hard-drive type has been selected in the BIOS Setup. Also, check to see that all of the jumpers in the hard disk drive unit have been set correctly.

Floppy Disk Controller Error or No Controller Present: When you cannot find or initialize the floppy drive controller, please check that the controller settings in the BIOS Setup screen match the actual controller being used. If no floppy drives are installed in your PC, be sure the `Diskette Drive` field of the Setup screen is set to NONE.

Keyboard Error Or No Keyboard Present: When this error message appears, check to see that your keyboard is attached properly to its receptacle. Make sure JP6 is jumpered for keyboard. Also, be sure that no keys are being pressed during the booting process. If you are purposely configuring the system without a keyboard, set the error halt condition in Setup to HALT ON ALL, BUT KEYBOARD. This will cause the BIOS to ignore the missing keyboard and continue the boot.

Appendix C: Troubleshooting

Memory Address Error: If the memory address indicates an error, use the specified location and the memory map for your system to find and replace the bad memory chips.

Memory Size Has Changed: Memory has been added or removed since the last boot. In EISA mode, use the Configuration Utility to re-configure memory. In ISA mode, enter the BIOS Setup screen and type the new memory size in the memory field.

Memory Verifying Error : It indicates an error verifying a value already written to memory. Use the specified memory location and your system's memory map to locate the bad chip.

Offending Address Missing: This message is used in connection with the I/O CHANNEL CHECK and RAM PARITY ERROR messages when the segment that has caused the problem cannot be isolated.

Reboot Error: When this error occurs, you must re-boot. Press any key and the system will re-boot.

System Halted: Indicates that the present boot attempt has been aborted and the system must be re-booted. Press and hold down the CTRL and ALT keys and press DEL.

Appendix C: Troubleshooting

Appendix C: Troubleshooting
